

| Experiment | Focus | Number of specific experiments | Years per experiment | Total years ^a | Knowledge gap to be addressed |
|--|--|--|-------------------------------|--------------------------|---|
| Background stratospheric aerosol (BG) | Stratospheric sulfur budget in volcanically quiescent conditions | 1 mandatory + 2 recommended | 20 | 20 (60) | 20-year climatology to understand sources and sinks of stratospheric background aerosol; assessment of sulfate aerosol load under volcanically quiescent conditions |
| Transient Aerosol Record (TAR) | Transient stratospheric aerosol properties over the period 1998 to 2012 using different volcanic emission data sets | 4 mandatory + 3 optional experiments recommended are 5 (see also Table 4) | 15 | 60 (75, 105) | Evaluate models over the period 1998–2012 with different volcanic emission data sets; understand drivers and mechanisms for observed stratospheric aerosol changes since 1998 |
| Historic Eruption SO ₂ Emission Assessment (HErSEA) | Perturbation of stratospheric aerosol; from SO ₂ emission appropriate for 1991 Pinatubo, 1982 El Chichón, 1963, Agung | For each ($\times 3$) eruption control, median and 4 (2×2) of high/low deep/shallow (see also Table 6) | 4 recom. 6 | 180 (270) | Assess how injected SO ₂ propagates through to radiative effects for different historical major tropical eruptions in the different interactive stratospheric aerosol models; use stratospheric aerosol measurements to constrain uncertainties in emissions and gain new observationally constrained volcanic forcing and surface area density data sets; explore the relationship between volcanic emission uncertainties and volcanic forcing uncertainties |
| Pinatubo Emulation in Multiple Models (PoEMS) ^b | Perturbed parameter ensemble of runs to quantify uncertainty in each model's predictions | 10 experiments per parameter, where the number of parameters refers to the minimum (3), reduced (5), or standard (8) parameter set (see also Table 10) | 3 per experiment ^c | 90 (150, 240) | Intercompare Pinatubo perturbation to stratospheric-aerosol properties with full uncertainty analysis over PPE run by each model; quantify sensitivity of predicted Pinatubo perturbation stratospheric aerosol properties and radiative effects to uncertainties in injection settings and model processes; quantify and intercompare sources of uncertainty in simulated Pinatubo radiative forcing for the different complexity models |